

Claims

[c1] I claim as my invention:

1. An iron golf club head comprising:
a periphery member having a sole wall, a toe wall extending upward from the sole wall at a first end of the sole wall, a hosel extending upward from the sole wall at a second end of the sole wall, and a heel wall extending upward from the sole wall, the periphery member composed of a nickel-tungsten-chromium alloy having a density ranging from $9.0\text{g}/\text{cm}^3$ to $10.5\text{g}/\text{cm}^3$, and a Rockwell Hardness ranging from 50 to 92;
a central member coupled to the periphery member, the central member being composed of a non-metal material and having a body portion with a forward surface, a rear surface, a sole surface, a top surface, a toe surface, and a heel surface, the central member having a cavity formed in the rear surface of the body portion; and
a face plate composed of a metal material having a lower density than the nickel-tungsten-chromium alloy, the face plate being coupled to the periphery member and disposed over the forward surface of the central member.

- [c2] 2. The iron golf club head according to claim 1, wherein the periphery member further includes a top wall extending from an upper end of the toe wall to an upper end of the heel wall.
- [c3] 3. The iron golf club head according to claim 1, wherein the metal material of the face plate comprises a titanium alloy.
- [c4] 4. The iron golf club head according to claim 6, wherein the face plate has a thickness ranging from 0.040 inch to 0.250 inch.
- [c5] 5. The iron golf club head according to claim 1, wherein the central member is composed of a bulk molding compound.
- [c6] 6. The iron golf club head according to claim 1, wherein the central member is composed of a thermoplastic material.
- [c7] 7. The iron golf club head according to claim 1, wherein the central member further includes a flange extending from the top surface at an intersection of the top surface and the forward surface, and wherein a top line of the face plate is in contact with the flange of the central member.

- [c8] 8. The iron golf club head according to claim 1, wherein the club head has a moment of inertia I_{xx} through the center of gravity of at least 2600 g-cm^2 and a moment of inertia I_{zz} through the center of gravity of at least 2400 g-cm^2 .
- [c9] 9. The iron golf club head according to claim 1 wherein the periphery member has a volume percentage of the golf club head ranging from 15% to 50%, and a mass percentage of the golf club head ranging from 50% to 80%.
- [c10] 10. The iron golf club head according to claim 1 wherein the central member has a volume percentage of the golf club head ranging from 25% to 75%, and a mass percentage of the golf club head ranging from 10% to 30%.
- [c11] 11. An iron golf club head comprising:
a body composed of a castable nickel-tungsten-chromium alloy comprising 35 to 70 weight percent nickel, 20-35 weight percent tungsten and 10-30 weight percent chromium, the nickel-tungsten-chromium alloy having a density ranging from 9.0 g/cm^3 to 10.5 g/cm^3 , and a Rockwell Hardness ranging from 50 to 92.
- [c12] 12. The iron golf club head according to claim 11, wherein the nickel-tungsten-chromium alloy comprises

35 to 50 weight percent nickel, 30–35 weight percent tungsten, 20–30 weight percent chromium and 1 weight percent silicon.

- [c13] 13. The iron golf club head according to claim 15, wherein the nickel–tungsten alloy has a density ranging from 9.2 g/cm³ to 10.0g/cm³.
- [c14] 14. The iron golf club head according to claim 14, wherein the nickel–tungsten alloy has a Rockwell Hardness ranging from 80 to 91.
- [c15] 15. An golf club head comprising:
a body having a face plate, a top wall, a sole, a heel end and a toe end, a portion of the body composed of a castable nickel–tungsten–chromium alloy comprising 35 to 70 weight percent nickel, 20–35 weight percent tungsten and 10–30 weight percent chromium, the nickel–tungsten–chromium alloy having a density ranging from 9.0g/cm³ to 10.5g/cm³, and a Rockwell Hardness ranging from 50 to 92.
- [c16] 16. An article of manufacture comprising:
a body composed of a castable nickel–tungsten–chromium alloy comprising 35 to 70 weight percent nickel, 20–35 weight percent tungsten and 10–30 weight percent chromium, the nickel–tungsten–chromium alloy

having a density ranging from 9.0g/cm^3 to 10.5g/cm^3 , and a Rockwell Hardness ranging from 50 to 92.

- [c17] 17. An article of manufacture comprising:
a body having a portion composed of a castable nickel-tungsten-chromium alloy comprising 35 to 70 weight percent nickel, 20-35 weight percent tungsten and 10-30 weight percent chromium, the nickel-tungsten-chromium alloy having a density ranging from 9.0g/cm^3 to 10.5g/cm^3 , and a Rockwell Hardness ranging from 80 to 92.
- [c18] 18. A method of manufacturing an article, the method comprising:
investment casting the article from a composition comprising 35 to 70 weight percent nickel, 20-35 weight percent tungsten and 10-30 weight percent chromium; wherein the investment cast article has a density ranging from 9.0g/cm^3 to 10.5g/cm^3 , and a Rockwell Hardness ranging from 80 to 92.
- [c19] 19. The method according to claim 18 wherein the composition further comprises 1 weight percent silicon.
- [c20] 20. The method according to claim 18 wherein the article of manufacture is a portion of a golf club head.